The Excavating Engineer

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Diesel Shovel Operation on Southern Pacific in Arizona

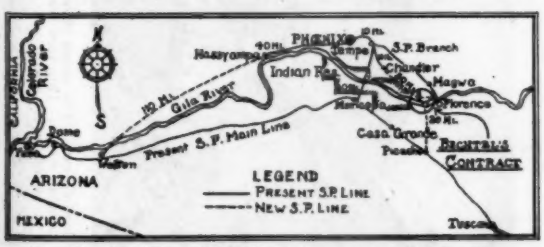
Description of W. A. Bechtel's Contract on the Southern Pacific Extension in Southern Arizona, with Particular Reference to the Operation of a Diesel Shovel in Heavy Rock

ON December 26th of last year, the Southern Pacific Company awarded the contract for the first section of the so-called Phoenix cut-off. This new piece of line, together with a subsequently awarded stretch of 110 miles from Hassayampa, Arizona, to the main line at Wellton, has a double purpose. As our map shows it not only provides a much-needed cut-off to Phoenix, putting that city on the main line of the Southern Pacific, but it also gives that railroad a double track line through Arizona.

The first contract calls for fifty miles of new line from Chandler, which is on a branch line thirty miles southeast of Phoenix, to Picacho on the main line 5 miles southeast of Casa Grande and nearly 50 miles northwest of Tucson, also a six-mile connection near the Gila River with the Southern Pacific's Florence branch.

Bechtel's Contract

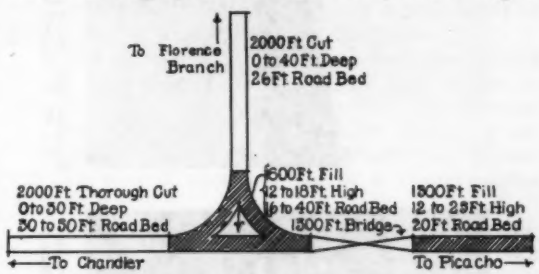
It is with the Chandler-Picacho line that this article is concerned. Contract was awarded to C. E. Crowley of Los Angeles, and consisted for the most part of team work, with the exception of several small cuts near Sacaton and about



Map Showing W. A. Bechtel's Subcontract on the Southern Pacific's Arizona Extension.

150,000 cubic yards of rock excavation which was sublet to the well-known contractor, W. A. Bechtel of San Francisco.

This contract consists of two heavy thorough cuts and two fills near the Gila River, crossing about 6 miles from Florence. Each cut contains approximately the same amount of material, 70,000 to 75,000 cubic yards, all rock. One is on the branch line to Florence, 2000 feet long by 26 feet wide, with a cut running from zero to 40 feet. The other, on the new main line to Chandler, is the same length, 30 to 50 feet wide, with a depth



Sketch Showing Details of Bechtel's Work Near Florence.

up to 30 feet. As may be seen from our map, the construction at this point involves a "Y" or small triangle formed by the main line, the Florence branch and a short cut-off north of the Gila River between the main line and the branch. The crossing of the Gila River is made by a bridge 1350 feet long, with nine 150-foot spans which is being built by the railroad company's own forces. The fills for both the approaches of this bridge are included in Bechtel's contract. That on the Picacho side is for a 20-foot roadbed 1500 feet long and 12 to 25 feet high. The other approach, which also forms the third side of the above "Y," consists of a roadbed 16 to 40 feet wide, 1600 feet long by 12 to 18 feet deep. The maximum haul is 9000 feet.

Actual work was started on this contract on January 1st, and has just been completed. Rail is being laid by the Southern Pacific's own forces. The line will be open for traffic the last of the year.

Diesel Shovel Used

The work commands particular interest because of the use thereon of a Bucyrus 50-B 1¾-yard revolving shovel, driven by a Diesel engine.

Bucyrus 50-B Diesel Shovel, 1¼-yard Dipper, Loading 4-yard Cars in Heavy Rock Cut for W. A. Bechtel on His Contract on the Southern Pacific near Florence, Arizona.

Rock Fill for the Bridge Approach Across the Gila River.

Looking back through one of the rock cuts through which the 50-B Diesel shovel has excavated. This gives an excellent conception of the character of the digging.

Another view of the Diesel loading cars. The steam shovel in the background is taking off the first cut, loading trucks. This view was taken at an early period in the operations.

Views of W. A. Bechtel's Contract for the Southern Pacific's Natron Cut-off in Oregon which has recently been completed. A 50-B Bucyrus steam shovel is shown in operation.

This shovel has been used continuously in rock.

The Diesel-type shovel was selected mainly because of the fact that the available water was unsuitable for use in a boiler. An Osgood 29 was in use during the early stages of the work before the plant was entirely assembled. It was mainly used for loading seven trucks and casting dinky track roadbed. Its performance was satisfactory, except that water conditions proved so bad as to prevent economical steam shovel operation.

Other Equipment

The Bucyrus is served by sixty 4-yard Western dump cars hauled by three 7-ton and two 12-ton gasoline locomotives, Plymouth, Whitcomb and Davenport.

The drilling is done by 18 Ingersoll-Rand jackhamers, air for which is supplied by two 350-cubic-foot Ingersoll-Rand compressors driven by 60 h. p. Atlas-Imperial Diesel engines, together with three 270-foot portable gas-driven compressors of the same make. All compressors are located at one central point most of the time, and air is distributed around the job from this point. However, when necessary the portable compressors are moved out and used as boosters at different points along the air line. They also have a No. 33 Leyner Sharpener and an Ingersoll-Rand No. 24 oil furnace on the job.

The Blasting Method

The greater part of the blasting is done by drilling vertical holes from the top of the bank. Where heavy cuts were encountered, additional charges were loaded by tunnelling in at the toe of the bank by the "coyote" method. At times as many as twenty jackhammers were in use at one time. Black powder, dynamite and gelatin have been used.

A great part of the rock has been difficult to break up well, and required plug holing and bull dozing as may be seen from some of our views.

Shovel Operation, Output and Costs

In spite of the exceedingly heavy digging the Diesel shovel has averaged 700 cubic yards per nine-hour shift and has loaded 1175 four-yard cars in three shifts.

It is using as fuel 24 degree gravity oil costing 5 cents per gallon delivered, and consuming 36 gallons per shift, or 4 gallons per hour, which means a fuel cost of 20 cents an hour in the hardest character of rock excavation.

The shovel has been operated double shift of nine hours each about half of the time.

For night work the entire job has been lighted by an electric lighting system, three miles in length. This system has provided illumination for the dumps, and paralleled the dinkey track with lights spaced every 50 to 100 feet. Power for this system was supplied by a Diesel engine generator.

The work has been under the active supervision of S. D. Bechtel and K. K. Bechtel, both sons of W. A. Bechtel. Either or both of these gentlemen have been on the work constantly since it started.

The assistant engineer in charge of the Arizona extensions for the Southern Pacific is A. C. Barclay, Assistant Engineer.

The Hassayampa-Wellton Extension

Contract for the 110-mile Hassayampa-Wellton extension was let after the Crowley contract to the Utah Construction Company, which has in turn sublet most of it.

Bechtel's Record

W. A. Bechtel is one of the most active and successful contractors on the Pacific Coast. He has his general offices in San Francisco and a branch office in Los Angeles. He is operating eleven shovels on his various contracts, together with a large amount of other equipment. He has won for himself an enviable reputation not only of keeping his equipment, at all times, in first-class shape, but in being able to move on to a job he has secured without loss of time. The efficiency with which his contracts have always been handled is evidenced by his long record of successful achievements.

In December of last year he finished up in

remarkably quick time a section of the Southern Pacific Company's Natron Cut-off in Oregon, which he had sublet from the Utah Construction Co. He used four revolving shovels and one railroad-type shovel on this work. He also has under way another contract for the Southern Pacific, a double-tracking job on the summit of the Sierra Nevada Mountains, on which he is using five shovels. He is also completing a three-year job for the Western Pacific at Stockton, California, which involves about a half-million yards of excavation for new freight yards, 15 miles of track, concrete roundhouses, machine shop, etc. This contract is further described elsewhere in this number.

In addition to the above is a recent contract covering the construction of a double-track tunnel on the Northwestern Pacific Railroad near Greenbrae, California, which work he is carrying on while the line is kept open to traffic.

The above alone speaks eloquently for his reputation on the Pacific Coast as a railroad builder.

Digging a Sewer in Record Time Near Detroit

Bill Hayes, Contractor, Builds One Hundred and Twenty Feet per Day for Sixty-Two Consecutive Days with Dragline Excavator and Revolving Shovel

JUST outside of Detroit's northern boundary lies the suburban residential village of Ferndale in Oakland County. Through Ferndale runs a section of the Red Run Trunk Sewer, part of the drainage system for which Oakland County recently floated a three-million-dollar bond issue. This system, modern and elaborately planned, will furnish drainage north of the 8-Mile Road where the Chicago watershed divides. The Bill Hayes organization of Detroit had the contract for a section running along Campbell Road, between the 12-Mile Road and 9-Mile Road. This section covered approximately 9,000 feet, 200 of which was tunnel work under the railroad tracks of the Grand Trunk.

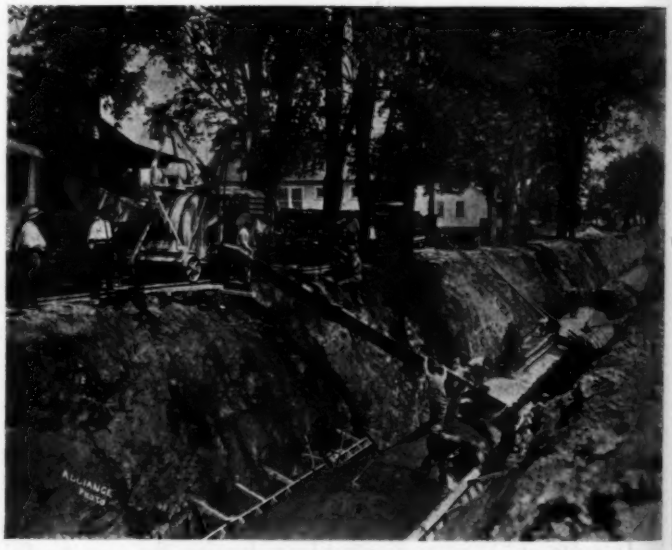
Dimensions of Tube

A great deal of interest has been shown in this job all over the country. The sewer is of 9 feet inside diameter, of circular cross-section, 14-inch wall at the bottom and 12-inch wall at the top, with 20 inches thickness at the construction joint on the sides. The cut, at the bottom of which this monolithic concrete tube was poured, ran from 23 to 27 feet deep, 30 feet wide at the top and 13 feet on the floor. This ditch was dug, cement was poured, forms removed, and the earth filled in behind the completed job at the rate of 120 feet of completed sewer every day for 62 consecutive days. This exceptionally fast time includes the time necessary to place junction outlets for local sewer connections and underpinning bridges.

120 Feet Per Day

The extremely efficient manner in which the work was planned and carried out is largely responsible for the making of what is claimed to be a world's record, for the equipment on the job, although of the best, could never have functioned with such unvarying precision without the management behind it.

A Bucyrus 50-B steam dragline excavator with 55-foot boom and 1½-cubic-yard bucket, was entrusted with the job of digging the ditch. Ahead of this dragline moved a small Erie machine which took out the two cubic yards per foot which had to be wasted. This machine worked in a shallow cut and loaded into trucks on the bank. The dragline worked in this shallow cut, completing the ditch. It is interesting to note what the superintendent says about the operation of



Showing the method of pouring concrete. Note the Rex Mixer mounted on rails parallel to the ditch.

Part of the crew responsible for the record sewer job. Note the manner in which forms were removed.

Looking along the ditch from the completed sewer over the windlass which was used to remove the forms. Note the Bucyrus 50-B dragline in the background.

50-B dragline excavator digging the ditch for the Red River Sewer on which was made what is claimed to be a world's record; removal of from 7 to 14 cubic yards per foot was required.

Showing method by which material to be wasted was loaded into trucks from a shallow cut ahead of dragline excavator. Note that the dragline is equipped with electric lights for night work.

this machine: "The total excavation ran from 7 to 14 yards per foot; about two yards of this was wasted by the Erie, the Bucyrus 50-B handled all the rest, trimmed the bottom and took care of the slopes. The rig could have dug the entire 120 feet which was made per day in the 9-hour day time shift, but it was never allowed to dig ahead because it was not desired to leave the ditch open any longer than was absolutely necessary."

The 50-B Bucyrus, therefore, started in at 4 o'clock in the morning and dug until 9 o'clock, after which it worked only when necessary to keep the cut open ahead of the gang setting the forms.

A construction railroad was laid from the point where the material was unloaded from the railroad line to the work. One-yard cars were filled with the necessary materials and hauled over this contractor's line by an American gasoline locomotive; the materials were dumped from the small one-yard cars directly into the hopper of the concrete mixer, which was mounted on rails paralleling the railroad line.

This job was finished about four months ahead of contract time, and during the entire time the crew of 42 men never failed to make the 120 feet per day. Upon the completion of this job the outfit moved to the 12-Mile end of the sewer, where they began construction upon what is known as the Clawson Sewer, running 16,000 feet to the outlet.

We are indebted for this information to Wm. J. Ryan, superintendent of the job, who says that the record was made chiefly by the efficient handling of the dirt taken out of the hole.

On June 14th, 1925, at Leaneck, New Jersey, Mr. John H. Hayward passed away at the age of 78.

Mr. Hayward was known throughout the country as the "Father of the Automatic Bucket," having made, with a Dr. Johnson, the first bucket of this type.

At the time of his death he was vice-president and treasurer of the Hayward Company.

Railroad Construction with Diesel-Driven Revolving Shovels

A Description of H. W. Nelson's Work on the Illinois Central Section of the Edgewood Cut-off Project — a 2,700,000 Cubic Yard Contract

LAST November contracts were let for the excavation on the Illinois Central section of the new Edgewood Cut-off project. This new line, described in the July issue of *The Excavating Engineer*, runs from Fulton, Kentucky, to Metropolis, Illinois, where, crossing the Ohio River on the bridge of the Paducah and Illinois Railroad, it connects with the new line of the Southern Illinois and Kentucky Railroad. The whole length of the cut-off is 166 miles, of which 42 miles in Kentucky is being built by the Illinois Central. On this forty-two miles of line, two general contractors are at work, namely, H. W. Nelson Company and the Dominion Construction Company.

H. W. Nelson's Contract

The H. W. Nelson Company have the contract for the excavation on the southern twenty-five miles of the section. This contract calls for the handling of approximately 2,700,000 cubic yards of material, most of which is common excavation. Nelson's present work extends north from a point about six miles out of Fulton to Lowes, Kentucky. The excavation on which they are at present working is chiefly in deep cuts, with material to be hauled rather long distances to fills which run from 20 to 45 feet high.

General Arrangement of Work

For this excavation the Nelson Company purchased three Bucyrus 50-B Diesel-driven shovels equipped with 1¾-yard dippers. The reasons for selecting shovels with Diesel engine motive power included the difficulty of obtaining a reliable supply of good boiler water, and the desire to reduce to a minimum the cost of fuel. Gasoline locomotives (Milwaukee and Whitcomb) were purchased for hauling the 5-yard Western cars which serve the shovels; here again the desire to keep water and fuel costs low were considerations in the purchase.

The work is being handled by three construction camps, No. 1 at Beelerton, about six miles from Fulton; No. 2 at Baltimore, about fourteen miles north of Fulton; and No. 3 at Dublin near the northern end of their contract.

The shovel for camp No. 1 was erected at Water Valley and that for No. 2 at Wingo. They went over the road under their own power, three

One of the Diesel-driven 1¾-yard shovels on Nelson's contract. Recently one of these three machines loaded 501 5-yard cars in a ten-hour shift.

Dumping a train of ten 5-yard Western cars from a thirty-three-foot trestle. The train is handled by a Milwaukee 10-ton gas locomotive.

Looking South at Camp No. 1 Toward the 50-foot Cut Upon Which the Shovel May Be Seen at Work in the Background

General view looking north of fill at Camp No. 2. In the right background may be seen the cleared right-of-way at camp No. 3 from which a fill will join with that shown here.

One of the Three Diesel-driven 1¾-yard Bucyrus Shovels Loading a Train of Eight 5-yard Western Cars Drawn by a 12-ton Whitcomb Locomotive

Views on H. W. Nelson Company's Illinois Central Contract on the Edgewood Cut-Off in Kentucky

and a half miles to camp No. 1 and about seven and a half miles to No. 2. The third shovel was erected at Pryors and traveled eight miles to camp No. 3. It is interesting to note that on the 7½-mile trip to camp No. 2 it was necessary to shore up and place rail re-enforcing upon 26 small road bridges, as the roads are little traveled and the bridges of very light wooden construction. The locomotives and dump cars were hauled over the road by a Best tractor.

Fuel Cost and Consumption

Fuel oil is delivered to the Nelson Company at Wingo, where they have a 10,500-gallon storage tank. From this point the 5-ton Best delivers the oil to the camps, an eight-wheel wagon, carrying from eighteen to twenty 50-gallon drums at a load, being used. The fuel oil costs seven cents a gallon F. O. B. Wingo. The fuel consumption of the shovels averages about 25 to 30 gallons per ten-hour shift per shovel; this means a fuel cost of about $2.00 per shift, or, for all three shovels, only $6.00 per shift. This fuel consumption obtains with an output of from 3,000 to 3,400 cubic yards per shift, pit-measurement, for the three shovels.

Gasoline is delivered on the job in tank wagons by the oil company, and is stored at each camp in a 500-gallon tank. The cost is 21 cents delivered. The locomotives each burn from 25 to 35 gallons per shift.

Sixty-four-foot cut at camp No. 2. This cut involves 350,000 cubic yards.

Camp supplies are hauled from Wingo by the 5-ton Best and the eight-wheel wagon.

Native timber for trestles is delivered on the job at a cost which saves the Nelson Company an amount which would be equal to the transportation cost of timber bought elsewhere.

Excavation Common

The material is chiefly clay, with some sand and gravel and cemented gravel. All cuts are made with 1 to 1 slopes, and all slopes are hand-trimmed. The fills are natural slope, about 1 to 1½. Cuts are made 32 feet wide and fills are 20 feet on grade.

Camp No. 1, Beelerton, Kentucky

At the time this article is written, camp No. 1 is working on a cut 1,000 feet long, involving excavation of some 300,000 cubic yards. This cut runs rather deep over its entire length and is 58 feet 9 inches at the deepest point.

Mr. Samson, superintendent on the job, says that it is in such cuts as these that the shovels show to best advantage, as with their long reaches and full revolving features the entire cut can be

R. N. Samson, superintendent, to the left, and Charles Jackson, foreman, at Camp No. 1.

finished in just seven trips through. It is not necessary to deadhead the shovel back through the cut or turn it after each time through.

At this camp they are serving the shovel with four trains of ten 5-yard cars, the material being hauled about a mile and a half. They have on the job one 10-ton Milwaukee and three 12-ton Whitcomb gas locomotives, forty 5-yard heavy-duty Western dump cars and a Western narrow gauge spreader. The outfit has been moving on an average of 300 cars per shift, and have recently made a record of 501 5-yard cars in ten hours.

Wick Schilling handles the levers of the shovel during the day and George Long at night. Charles Jackson is foreman on the job. The shovel, as are those at the other two camps, is equipped with a Kohler lighting plant, and the work is carried on with two ten-hour shifts.

Camp No. 2, Baltimore, Kentucky

At camp No. 2 the Bucyrus 50-B is working on a 64-foot cut which is 6,000 feet long and con-

tains about 350,000 cubic yards. The haul at present is about a mile. The fill made from this material is from 30 to 35 feet high and will be 8,000 feet long. Three 10-car trains serve the shovel. On the job are four 10-ton Milwaukee and one 12-ton Whitcomb gas locomotives, 32 5-yard Western heavy duty cars and a Western narrow gauge spreader. Pete Nelson is foreman on the job. Fred Cheevers runs the shovel during the day and C. Wilson at night.

These three 5-yard cars fell from the top of a 35-foot fill. The 5-ton Best tractor hauled them up the slope.

Camp No. 3, Dublin, Kentucky

Here the shovel is served by five 12-ton Whitcomb gas locomotives and forty 5-yard Western cars. The cut is 8,000 feet long, over 3,000 feet of which length the depth runs about 64 feet. The material to be moved amounts to 500,000 cubic yards. The haul is about two miles at the present time. The fill, which runs about 35 feet high, is 6,500 feet long. The day shifts on this job average about 316 five-yard cars and the night shift about 290 cars. The work is in charge of J. J. Connor, foreman. H. R. Perry runs the shovel on the day shift, and Edgar Adams on the night shift.

H. W. Nelson Company have sublet about 400,000 yards of excavation to Waugh Bros., Inc., Goodwin & Wade, who have moved in a 1¼-yard Osgood, a ¾-yard Erie, forty 4-yard narrow gauge cars and four 18-ton steam locomotives.

R. N. Samson is the superintendent in charge of the work for H. W. Nelson Company. F. W. Armistead is assistant engineer in charge of the work for the Illinois Central Railroad, and B. P. Brevard and H. W. Clowe are the resident engineers on the residencies covered by the contract.

Trench Excavation in Coral Rock Near Miami, Florida

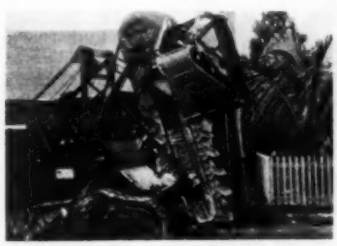
Unusually Stiff Digging Accomplished by J. W. Rollins Company, Inc., in Dade County with a Vertical Boom Ditcher

In Dade County, Florida, the land formation is made up of coral rock, a limestone which is peculiar to this section and which often is very hard, so hard that when post holes are dug by hand it is necessary to use considerable dynamite.

The John W. Rollins Co., Inc., of Miami, Florida, were confronted with the problem of digging seven miles of trench through this material for the gas department of Florida Light and Power Company, under a subcontract with the Phoenix Utilities Company. This trench was to be 19 inches wide and the shallowest portion ran about 54 inches deep. The Rollins Company purchased a Barber-Greene vertical boom ditcher for the work, although experience had shown that the ladder type of machine was not satisfactory in such heavy work. This vertical machine has proved successful on the work, completing the seven-mile trench at the rate of about 400 yards per day, and with an operating cost of $20 per day, not including wear and tear. The bucket teeth had to be removed and resharpened at the end of every 1000 feet of digging — this is a good indication of the severity of the excavation, as on a job through easy digging in Illinois the teeth on a similar machine completed eleven miles of trench without sharpening.

The seven-mile trench lay through city streets, many of which were paved with macadam, through which the machine dug without apparent labor. In many places the machine encountered telephone poles very close to the trench line, around each of which it was necessary to move the machine, leaving about thirteen feet of trench

2:10 P. M. — Ditcher Encounters Pole on Path.



2:13 P. M. — Machine Moving Around Obstruction with Boom Raised.

2:15 P. M. — Machine Digging Again, Traction at Rest, Boom Being Sunk Vertically.

to be dug by hand. The digging speed in this heavy work was about one foot per minute.

The machine was also used for digging pole holes, and sunk as many as 40 per day, 5½ feet deep, and 32-inch x 19-inch section, at a cost in the neighborhood of 50 cents apiece, which compared very favorably with the hand labor cost of about three dollars plus a stick of dynamite.

Showing Amount of Material Left for Hand Excavation After Ditcher Has Moved Around Pole Encountered in Its Path

View of finished trench showing nature of coral rock. 35-foot laterals were dug at right angles to and connecting with this trench.

The Rollins Company also had occasion to cut a trench for curb and gutter forms 18 inches deep, and used the ditcher to good effect on the job. The digging speed was three feet per minute, considerably faster than with the deeper ditch, but in normal soil would have been as high as 10 ft. a minute.

Spoil Conveyor Depositing on Left, Keeping Road Clear

Spoil Conveyor Swung to Right to Clear Porch

These Men Quarry 95 Per Cent of the New York City's Trap Rock

The illustrations below show two of the most important individuals in the trap rock quarrying industry of the Hudson. Mr. W. S. Miller (on reader's right) is superintendent of the Tomkins Cove Stone Company, and the other will be recognized as R. T. Gent, general superintendent of the New York Trap Rock Company.

These two men represent companies which quarry and ship about 95 per cent of the trap rock that comes into New York City, one of the most important industries along the Hudson River.

The Tomkins Cove Stone Company has a quarry at Tomkins Cove, New York, on the east bank of the Hudson, and the New York Trap Rock Company has quarries at Marlboro, Ver Plank's Point and New Hamburg. The aggregate tonnage of these quarries is about 600,000 tons per year.

New Type of Road Saves Concrete

Twenty-four states have adopted as standard the design of cement roads worked out by the Highway Research Board. This design is only one of the many improvements in road-building made possible by the research of this organization.

This new type of cement road is very thin at the center but thick at the edges. Although this new design quite reverses the former design, whereby the road was thicker at the center, it not only makes a much stronger road but saves about 390 cubic yards of concrete per mile. At $10.00 per cubic yard for concrete this saving amounts to $3,900 per mile, or, if we assume that the twenty-four states will build 2,400 miles of concrete road that this year the saving will be $9,360,000.

A High ¾-Yard Shovel Output

The illustration below shows a Bucyrus 20-B shovel operated by Phillips & Company of Asheville, Alabama.

It is reported that this machine handled 935

cubic yards of chert in eight hours, loading the material into trucks.

Due to rain at 3:45 p. m. it was not possible to proceed, "but," writes C. J. Phillips, "had we been able to put in a full day of ten hours we would have loaded 1200 cubic yards."

This means an average of 2 cubic yards per minute — no mean record for a ¾-yard machine.

Fast Work with a Revolving Shovel

The output of a revolving shovel depends so much upon the material being excavated, the operator, and the general conditions of operation, that mere figures mean little to the seasoned operator. However, we have a report of a 1¾-yard steam shovel on one of W. A. Bechtel's recent contracts which we believe is worthy of attention.

Mr. Bechtel, whose work in Arizona and along the Pacific Coast is mentioned elsewhere in this number, is completing at this time a three-year contract at Stockton, California, for new freight yards for the Western Pacific. This contract involves about a half-million yards of excavation, twenty miles of track, six large concrete roundhouses, a machine shop and other structures. The material for the yard has been excavated from the railroad company's gravel pit near Carbona,

W. A. Bechtel's 1¾-yard shovel loading 32-yard Hart convertible cars. This machine has loaded 3050 cubic yards in ten hours.

which is about six miles from Tracy, California.

The equipment used has been a Bucyrus 50-B, 1¾-yard, caterpillar-mounted steam shovel and about 150 32-yard Hart convertible standard gauge cars. These cars are filled to an average of about 25 cubic yards per car. The 50-B is reported as getting out an astonishing amount of material per shift.

The best day's run to date is 3050 cubic yards in 10 hours, which is enormous even in easy digging. This material is well packed, and can be considered as fairly stiff digging. This yardage is the engineer's actual estimate which is on record. W. A. Bechtel, Jr., is in charge of this work. Jack Murray is pulling the levers of the 50-B.

A Novel Method of Breaking Pavement in Front of Shovel

Recently during the construction of a subway for the Illinois Central Railroad, Chicago, it became necessary to remove the pavement before proceeding with the excavation.

A heavy drop weight, with trigger and guide line, such as is used in foundry yards for breaking cast iron, is picked up by the dipper, raised

to any desired height, the trigger is pulled by the guide line, and the weight allowed to drop on the pavement.

After sufficient pavement is broken in this manner, the material is picked up by the shovel, loaded into trucks and disposed of.

Bucyrus Company Opens Pittsburgh Office

The Bucyrus Company, South Milwaukee, Wisconsin, announces the opening of a sales office at 461 Union Trust Building, Pittsburgh, Pennsylvania, in charge of Mr. A. R. Hance, formerly Northwestern Sales Manager of the Bucyrus Company. Mr. Hance will handle the sale of Bucyrus equipment in Ohio, western Pennsylvania, western New York, western Maryland, West Virginia and eastern Kentucky. Mr. Hance will be assisted by Mr. F. B. Smith who is already well known in this territory.

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Nitrogen and the Waning Fertility of Our Soil

This does not sound like a topic of direct and immediate interest to engineers and contractors. In spite of this fact, we are inclined to believe that its importance is so vital to the future of our nation that it should be in the minds of us all.

Hon. Martin A. Davey, Member of Congress from Ohio, has presented this subject to the House in a convincing and simple manner. Mr. Davey is a tree surgeon, and has given much of his life to the study of plant life.

He brings out several astonishing facts. Every migration in the history of the world has been in search of more fertile lands, after their old lands had been worked out by constant cultivation. China's famines are due to exhausted soil. Russia's soil produces but nine bushels of wheat per acre, hence her famines. In India there are said to be more hungry people every year than the total population of the United States. India is endeavoring to correct this by enormous irrigation schemes, one of which has been described in our columns.

In 1880 the population of the United States was a little over fifty millions, in 1920 it was nearly 106 millions, an increase of 110 per cent in 50 years. In 1880 the improved land in farms was about 285 million acres. In 1920 it was 503 million, or an increase of only 77 per cent. But the startling fact is that there is no such future possibility of increase in cultivated farm land, as the only additional available supply we have in the United States is but equal in area to the State of Illinois.

Already we notice deserted farms in New England and as far west as Ohio. This condition of worked-out land is slowly moving westward. This leads us to ask where we are going to turn to feed our future increase in population.

Mr. Davey tells us that there are ten elements that go to make up every plant. One of these, carbon, is taken from the carbon dioxide in the air. The plants "breathe" or absorb it through their leaves. The other nine elements come out of the soil. Six of these nine are usually found in ample quantities in every soil, the other three, nitrogen, phosphorus and potassium, are more quickly exhausted by the constant pumping out of these elements by growing plants.

Of these three, nitrogen, which is vital to growth, is the most quickly exhausted. It must be taken from the soil through the roots. It is soluble and is easily washed away by water. Nature adds a new supply, slowly, through decaying vegetable matter, but too slowly for our needs. It must, therefore, be added artificially.

On the strength of this vital need he pleads for cheap nitrates, and for the use of the great Muscle Shoals Plant for this purpose.

The supply of phosphate is limited. It is found in Tennessee, South Carolina, Georgia, Florida, and one or two western states. He asks that we prohibit its exportation.

How and when this shall be done is a question of vital importance to the American people. In the rush and hurry of our commercial life it should not be lost sight of.

Better Job Roads

A recent editorial in *The Engineering News-Record* contains an interesting observation.

The contractor of today does not have to count his years of experience very far into the past to recall the expensive and sometimes disastrous delays which were caused by poor job roads, the miring of mules and wagons, and the stalling of the shovel for reasons beyond the control of the shovel itself.

There is no question but that this condition has been immensely improved in the past few years. The credit of this can be laid mainly to the motor truck. The greater and greater use of this piece of equipment has demanded better conditions and more attention to roads into the pit. Nowadays plank ways are carried close to the shovels. They are graded and often surfaced. The same attention is given to roads that run to dumps and stock piles, connecting the job with the railway or the public highway. There is no question but what half a mile of bad road not only cuts down loads but reduces speed and profits, as this journal very truly says: "Twenty miles of broad paved highway running to the construction operation will not moderate the misery to the contractor of the half mile of rutted and soft trail which goes to his stock piles and steam shovels."

· FIELD NOTES ·

Carbon Removal Is Important

By P. L. Sniffin

One of the most important items of attention required by a motor truck is that at certain intervals the carbon must be removed from the cylinders. With most trucks this is necessary about every three or four thousand miles, but it may be required at much more frequent intervals, depending on how the truck is operated.

Excessive carbon deposits in the combustion chamber of a gasoline engine very often cause loss of power and noisy operation of the motor. These deposits result from burnt cylinder oil and sometimes from excessively rich mixture. They accumulate on the piston top and in the interior of the combustion head and valve chamber. They interfere with correct valve operation by gumming up the valves and prevent a full charge from reaching the motor, as well as retarding the prompt expulsion of burnt gases by building up around the valves.

The deposits in the cylinder head may cause trouble, owing to some projecting particle remaining incandescent from the heat of a previous explosion and firing the fresh charge prematurely. Carbon deposits always produce loss of power, but their presence is usually clearly indicated by a pronounced knocking or pounding noise. The only remedy for this defective condition is to remove them from the engine interior. This is done by scraping away the material with small hoe-form steel scrapers that may be inserted through the holes left when the valve chamber caps are removed, or by removing the cylinder head if the construction permits. This accumulation may be prevented by careful supervision of the amount of oil supplied the motor, making sure that it is never in excess of the actual requirements, using only the best grades of cylinder oil and by careful regulation of the fuel mixtures. These deposits may be reduced to some extent by injecting three or four tablespoonfuls of kerosene into the cylinders at the end of a day's run, through the priming cocks. This softens the deposit which has accumulated during the day, and when the engine is started up the next morning the dissolved carbon will be ejected through the exhaust, as it will be carried out by the burnt gases. The soft deposit is not difficult to cope with and, in fact, various chemical carbon removers are advertised quite extensively which will remove it without making it necessary to take the motor apart, and it may be burnt out with the aid of oxygen, provided the accumulations are not of too long standing. The hard, thoroughly baked-on carbon can only be removed positively by mechanical means.

Saving the Pavement

It is frequently necessary to transport caterpillar-mounted shovels or draglines over city pavements. The experience of the Metropolitan Railways of Sydney, Australia, is therefore of interest in this connection.

It became necessary to transfer their Class-14 Bucyrus caterpillar-mounted dragline excavator from the north end of the Hyde Park subway excavation to the west side of the park over the finest paved streets of that city.

This machine weighs nearly ninety tons with coal and water aboard, consequently the problem of making the trip without injury to the pavement was a serious one.

The boom and the "A" frame were removed to clear trolley wires, and transported by auto truck.

Hardwood timbers, 12 inches x 12 inches, were then secured to the revolving frame, one on each side, and loaded with about 9 tons of ballast to compensate for the weight of the boom and other parts removed. The dragline then proceeded under its own power.

In making sharp turns on the way wedge-shaped chocks were placed against the front end of the inside caterpillars, and made slippery by the application of water.

To assist the dragline on curves, two auto trucks were coupled to the front end of the machine.

This transfer was made under the personal direction of J. J. C. Bradfield, chief engineer for the Metropolitan Railway Construction and the Sydney Harbor Bridge.

We are advised that no damage was done to any portion of the road in route.

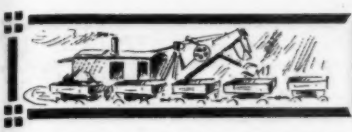
Shut Off Steam When Making Repairs

When it becomes necessary to make repairs or adjustments during working hours shut off the steam. Neglecting to do so is flirting with trouble.

We have record of a cranesman who went up on the boom to tighten a U-bolt, but he either forgot or neglected to shut off the steam. The wrench slipped, he lost his balance, his foot came in contact with the thrust engine operating lever, and the engine was off like a shot.

He had grabbed the shipper shaft gear to save himself. In an instant his whole hand was mangled as it passed between the gear and the shipper shaft pinion.

This is but one of many accidents that have happened through neglecting the above suggestion, and there are many more that may happen. Don't take a chance.

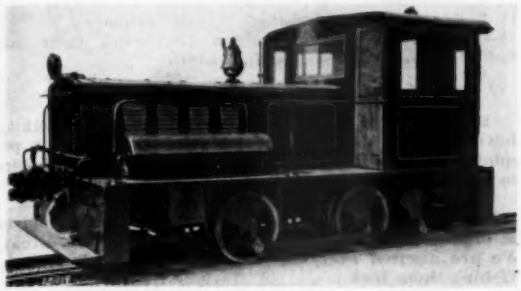


DEVICES YOU OUGHT TO KNOW ABOUT

New 20-Ton Vulcan Gasoline Locomotive

To meet the prevailing demand for heavier gasoline locomotives, the *Vulcan Iron Works, Wilkes-Barre, Pennsylvania,* have recently developed a new 20-ton machine, known as their Model HS-20.

The builders have designed and constructed this locomotive very much along the same lines as their other heavy models. Steam locomotive practice is followed very closely in the chassis construction. On standard-gauge track, in shifting railroad cars — for which work this machine is primarily adapted — the locomotive is furnished with M. C. B. automatic couplers, with spring buffer and draft rigging arrangement in the bumpers.



20-Ton Vulcan Gasoline Locomotive

The locomotive is powered with a heavy-duty Industrial type 6-cylinder, 125 h. p. motor, built with crank shafts of drop-forged chrome nickel steel, heat-treated and accurately machined as well as counterbalanced.

A built-in governor is provided, gear-driven and well-lubricated to guard the engine against overspeeding and racing. It also has a force-feed lubricating system to the main connecting rod and cam shaft bearings, proper oil pressure being maintained by a pressure relief valve.

The ignition system is of the synchronized dual type from a high tension magneto.

The motor is equipped with accessories, such as electric starter and generator, Stromberg carburetor, and storage battery. Locomotive is provided with an oversized multiple disc clutch running in a bath of oil.

A 20-Ton Vulcan Undergoing Test on Manufacturer's Track

The transmission is a perfected trouble-proof mechanism. By using constant mesh gears instead of the sliding type, speed changes are made by the engagement of jaw clutches. Gears, clutches and shafts are chrome nickel alloy steel forgings, heat treated and hardened.

The final drive is by means of driving and parallel rods from cranks on the jack shaft to the crank pins in the driving wheels, providing traction on all wheels.

The air equipment is of the straight air and automatic brake type, complete with air compressor, distributor valve, reservoirs, and all accessories. The air compressor is driven from a power take-off of the transmission, and is provided with an automatic governor, throwing the air compressor out of engagement when the pressure in the reservoir reaches a predetermined point.

The cab on the standard-gauge locomotive is built very wide, to enable the operator to take all train signals when handling wide box cars and other railroad rolling stock. All the controls inside the cab are conveniently located for the operator to manipulate without leaving his seat near the window on right side of cab.

The locomotive is designed for four speeds forward and four speeds reverse, geared from 2 to 15 miles per hour, with a maximum drawbar pull of 12,000 pounds.

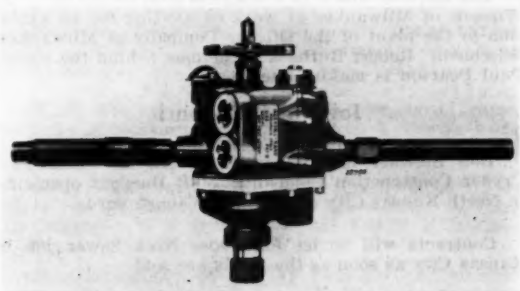
The locomotive has a comparatively short wheel base to negotiate reasonably sharp curves.

New Long Stroke Pneumatic Drill

A new design of four-cylinder pneumatic drills has been brought out by the *Ingersoll-Rand Company, 11 Broadway, New York City.*

A complete line of this type is now available, in both reversible and non-reversible sizes.

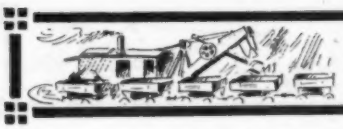
A speed governor is provided, which limits the speed of a drill after it has passed the point of maximum horse power, and so prevents racing and extra consumption of air. Cylinder liners of special steel, fitted into



the steel casing and easily removable and renewable, are incorporated. Crank pins are fitted with a sleeve held stationary on the crank pin, so that the wear takes place on the sleeve instead of the crank pin. Lubrication of the crank pins is from the inside as well as from the outside. Gearing is of helical type, giving strong construction and smooth operation. Connecting rods are of one-piece drop forgings. Crank shaft construction permits the use of solid end connecting rods and renewable crank pin sleeves.

The *Evinrude Motor Company, Milwaukee, Wisconsin,* has recently placed on the market a small centrifugal pump driven by one of their well-known portable gasoline motors of the type ordinarily used as detachable rowboat motor. The little pump has guaranteed pressure of 120 pounds, and will pump 1500 gallons of water per hour through a 1½-inch pipe line, one and one-third miles long. The weight of the motor is only 100 pounds. Further information may be obtained from the *Evinrude Motor Company.*

The *Republic Motor Truck Company, Inc.,* of Alma, Michigan, announce their Model 19, Third Series. A new truck of 3 tons capacity, this new model is replete with vital improvements in design and construction. Greater radiation area, weather-tight cab, deeper frame, longer springs, larger tires, etc., are examples of interesting improvements in design. The truck is supplied with wheel bases of 165 inches (standard), 156 inches and 185 inches.



SHOTS FROM THE · FIRING LINE ·

Central States Notes

R. N. Hines writes from 208 Grove Avenue, Elgin, Illinois, that he is operating an Erie for W. J. Newman Company of Chicago upon the new sewage disposal plant at Elgin.

The machine above is a Bucyrus 20-B owned by C. F. Wussow of Milwaukee at work excavating for an extension to the plant of the Oilgear Company at Milwaukee, Wisconsin. Robert Burback is the man behind the levers. Paul Pearson is making the smoke.

Iowa and Missouri

BY W. G. PARROTTE

Bob Stewart is pulling the levers on Carmichael Cryder Construction Company's 50-B Bucyrus operating in North Kansas City on the new Wabash yards.

Contracts will be let for Goose Neck Sewer job in Kansas City as soon as the bonds are sold.

List Construction Co. have moved their Bucyrus 50-B to Washington, Missouri, where they are working on the Missouri Pacific second track.

List Construction Co. of Kansas City were awarded contract for 30 miles of second track for the Wabash out of Detroit. Col. White will handle the grading end of the work.

Luck Bros. have finished up their road contracts in Colorado and have a ¾-yard shovel idle that they would like to put to work.

Leland Norris and Wm. Kelly of Pittsburg, Kansas, have organized a new coal company which will be known as the Peerless Coal Co. They expect to have their plant in full operation by fall.

Most of the strip operations in the Kansas coal fields are under full steam at this time.

News Around New York

BY T. A. BURNS

Mr. Chas. N. Nuchols, president of the American Hardware and Equipment Company, Charlotte, North Carolina, Bucyrus representative in North Carolina, arrived in New York Saturday. Mr. Nuchols is on a business trip to Quebec. Judging from the weather conditions in Charlotte, a trip to Quebec, though on business, would be a pleasure.

Mr. G. W. Patnoe, consulting engineer of Carey, Ohio, has been appointed to redesign and remodel the Rock Quarry for the Mathieson Alkali Corporation at Saltville, Virginia. Mr. Patnoe is one of the old-timers in the rock game, and was formerly associated with Mr. H. B. Eells, founder of the Bucyrus Company, in an Ohio Quarry.

New York Subway Progress

The Gillespie Co. have now made a fair start on their subway section.

Gustin & Morris are under way.

Rosenthal Engineering Co. are progressing.

Arthur A. Johnson Corporation should be about ready for an estimate.

J. F. Cogan Co. have their second estimate.

Rosoff Subway Construction Co. break their last month's record each succeeding month.

"The King Isn't King Any More"

Billy Wade is said to have been fishing or something down in Great South Bay, and tried to impress a pet opinion on the Captain of a boat that makes chasers necessary, the result was that Billy swam ashore.

John Bernado, John Jr., Frank and Joe are said to be organizing to do big rock excavating in the Bronx. We are assured everyone who knows them join us in wishing them luck.

Mr. Fred La Mura of the La Mura Contracting Co. is in the market for a number of airplane trucks to keep Frank Prescott busy on their new 30-B.

G. J. Atwell & Co. have the New York Life job on the old Madison Square Garden site. It is said to be a million-dollar cellar, and million-dollar cellars remind us of Charlie Hlings.

Joe Adams of 723 Cauldwell Avenue, Bronx, New York, is firing a Bucyrus 20-B for Mr. De Minnia.

Pacific Coast Notes

BY P. H. BIRCKHEAD

A. D. Kern, 290 East Salmon, Portland, who bid $760,300, alternative bid of $699,850, only bid submitted to the United States Engineers Office, Custom House, San Francisco, for furnishing and delivering jetty stone for jetty construction at entrance of Humboldt Bay, California. The work involves 200,000 tons more or less of jetty stone.

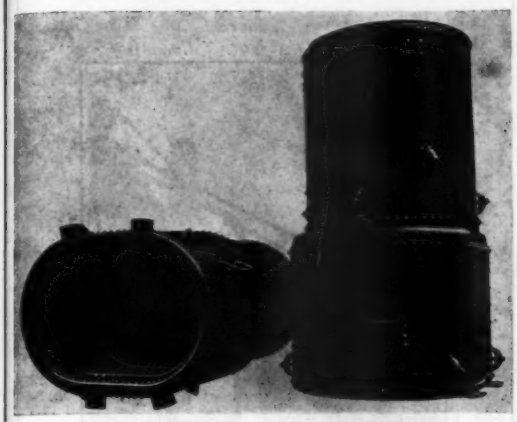
Contract awarded to W. E. Callahan Construction Co. and Smith Bros., Inc., 412 Second Street, Marysville, for construction of works for Reclamation District No. 2068, involving 730,000 cubic yards machine excavation, 217,000 square feet concrete or gunite lining, also pump house, culverts, timber bridges, metal flumes, farm crossings, etc., furnishing and installing four pumping plants.

Pittsburgh and Vicinity

BY FRANK B. SMITH

Mr. Raff, superintendent of Diamond Portland Cement Company, states that his Bucyrus 50-B two-motor electric is more than satisfactory and giving him good yardage, and he has had no item of expense for repairs since the installation of this shovel.

Sturm & Dillard has a 60-C Bucyrus shovel working on a gravel plant of the Concrete Material Company at Columbus, Ohio.



MADE TO ORDER

A new machine to meet modern requirements. A new job different and difficult. A new location with unusual working conditions.

Whatever your problem, let us co-operate with you in designing a special boiler exactly suited to your special needs.

JOHNSTON BROS., Inc.

Specializing in Boilers for Contractors' Equipment

FERRYSBURG, MICHIGAN

The Bucyrus 50-B shovel owned by John F. Casey Co., which is now working on the Canton cut-off, is giving good account of itself every day. Mr. Walsh is superintendent of this work.

Bill Lockhart of the Adena Coal Company reports that he has started up his 225-B Bucyrus on his property at Adena. This machine has been shut down for some time.

H. J. Minyman of Bloomingdale, Ohio, writes that he is operating a Bucyrus 50-B for the Belnan Coal Company.

Southern States Notes

BY W. W. WHORLEY

W. B. Cummings is stripping coal at Pocahontas, Alabama, for the Kershaw Mining Company.

Fred Bradshaw is digging the foundation for the new Jefferson County Court House at Birmingham with an Erie B.

Mr. F. C. Carey, superintendent for J. A. Kreis, on his Central of Georgia work at Sterrett, Alabama, paid us a visit recently and reports their work as about finished. W. A. Ford is handling a locomotive on this work.

Mr. Sam Alread, who is well known among mining circles in Alabama, is in charge of stripping operations for the Kershaw Mining Company near Pocahontas.

M. E. Kennedy, an old-timer in the shovel game, checked out recently, heading for Reid & Lowe's work on the East Coast Railway in Florida.

George King is running a Bucyrus 70-C on caterpillars for the Marcem Quarries Corporation at Gate City, Virginia. S. A. Miller is craning and W. F. McGhee is firing.

Jim Collins is also loading rock for the Marcem Quarries with a Bucyrus 70-C. Will Willliams is riding the boom and W. F. Hensley is keeping things hot.

According to recent announcement the Alabama Power Company will begin construction late this year on a $13,000,000 hydro-electric power plant on the Coosa River near Wetumpka, Alabama, about 15 miles from Montgomery. When completed this project will be the seventh hydro-electric power plant owned by the above company. The dam will be approximately 90 feet high and will contain 300,000 cubic yards of concrete. Plans call for an ultimate installation of 175,000 h. p. in 35,000 h. p. turbines. Aside from the power developed, the project will aid in developing navigation on the Coosa-Alabama system from Rome, Georgia, to Mobile, Alabama. The Alabama Power Company is now building a large hydro-electric plant at Cherokee Bluffs.

St. Louis Items

BY A. B. KOENIG

C. J. Moritz, Incorporated, Effingham, Illinois, have some grading work on Route 33, Effingham County, Illinois, suitable for two team outfits or one elevating grader outfit to sublet.

C. P. Yale of Yale & Reagan was in the city a couple of weeks ago looking over some cars.

Carmichael-Cryder Company was awarded contract of building the Wabash roundhouse in North Kansas City, and expect to get started on this at once.

Wm. E. Flanagan, of the Campania Constructora Nacional, who are building highways and roads in Panama, spent several days in St. Louis with his wife. Flanagan expects to return to Panama as soon as he gets rid of a slight touch of malaria. While in the States, he is going to look over some of the new Florida highways.

Otis Pelkey, Fort Dodge, Iowa, has 7 teams and fresno outfit idle. He wants to place them on some work in his neighborhood.

W. F. Woodruff is finishing his work at Belle Rive, Illinois. He will have outfit idle, and would like to have a job suitable for ten teams.

Seven miles of tracks of the St. Louis, Troy and Eastern Rilroad, once owned by the Donk Brothers Coal and Coke Company of St. Louis, in Madison County, Illinois, between Edwardsville and Troy, have been acquired by the Illinois Terminal Railroad, with headquarters at Alton, a belt line. The purchase of the trackage and extensive improvements planned for the immediate future involve an outlay of approximately $1,000,000, according to H. H. Ferguson, general manager of the Illinois Terminal Railroad. Improvements planned include an extension into St. Clair County to a point near O'Fallon, Illinois, at a cost of approximately $600,000. In addition, the terminal railroad company plans to spend $175,000 to bring its acquisition up to standard.

Charley Stoner came in from Mendota, Illinois, looking for a grading job. He says he has 30 teams, scraper and machine outfit idle there. No grading job too big if prices are right.

The Missouri Pacific Railroad was authorized by the Interstate Commerce Commission to construct a branch line from South Dupo to Columbia Quarry, near Krause, Illinois, a distance of 3½ miles.

Stauffer & Gardner have placed a concrete outfit on the Missouri Pacific double-track work west of here.

C. C. Barnes will finish his work on the Illinois Central Railroad next month. He wants a big grading job for four machine outfits.

John Albert Durnin of the Walsh Construction Company was married to Margarette An Laudenback of Sidney, Ohio, on June 20th (the longest day of the year). Durnin at present is stationed at Alvada, Ohio, on the Hockin-Valley Railroad contract of the Walsh Construction Company.

John Scanlan, 901 West Capitol Avenue, Little Rock, Arkansas, wants a job suitable for a ¾-yard caterpillar shovel.

Brubaker Company, 6015 Hoveler Avenue, Pittsburgh, Pennsylvania, report a small shovel idle.

Cook-O'Brien Construction Company, Railway Exchange Building, Kansas City, are finishing one of their highway jobs at Marceline, Missouri, and will have an elevating grader outfit idle that they can place on work immediately.

Hamer-Paskins Company, Chicago, are completing the overhead bridge for the Grand Trunk Railway on grade elevation in Lansing, Michigan. This firm has just been awarded three grading contracts in Northern Illinois and two bridge contracts in Northern Illinois by the Wabash Railroad.

THE BEST CHAIN
IS CHEAPEST IN THE END

Delays on the job, encountered with chain that is "just as good," make the price of the "cheap" product absolutely prohibitive to the contractor who knows his costs.

Taylor-Mesaba chain, built with 52 years' experience behind each link, is the cheapest in the long run.

Write for Catalog E

TAYLOR MESABA
STEAM SHOVEL CHAIN

S. G. Taylor Chain Co.
641 Marquette Building
CHICAGO, ILL.

ALWAYS, the efficiency of motor truck transportation must be measured in ton miles per dollar. So measured, the constant advancements and improvements in the structure of General Motors Trucks show clearly their immense value to the haulage buyers of America. From the beginning of the truck industry, General Motors Truck Company has required GMC Trucks to show a consistent increase in the value of the service they perform, and a steady decrease in the cost of performing it.

General Motors Truck Company, Pontiac, Mich.
Division of General Motors Corporation

General Motors Trucks

For convenience in making inquiry use postal inserted in this number.

Pickett Construction Company are getting along nicely on state road work near Grant City, Missouri.

Gaines Brothers are moving their outfit on to state road work in Boone County, Missouri.

Hal McCoy is busy on state road work near Lyndon, Kansas.

H. C. Wall landed a nice job from the Frisco Railroad at Deepwater, Missouri.

Lamroux & Coughey have their outfit at work on highway near Brookfield, Missouri.

Chas. Marshall reports rapid progress on the double-track job of the Rock Island Railroad at Dwight, Kansas.

H. C. Bothford has been doing street work in Kansas City, Kansas.

H. C. Herrin finished his work at Speckard, Missouri.

Jennings Construction Company are busy with a couple of outfits on the Missouri Pacific Railroad in Kansas.

Frank Smith has his outfit at work on some state road work near Burmingame, Kansas.

John Hogan of the Addison Miller, Incorporated, is receiving congratulations on arrival of John Jr. at his home July 2nd.

C. Z. Mitchell of the J. H. Flick Construction Company was with us a few days, and says their contract on the Rock Island Railroad in Kansas is near completion.

Contractors when in want of work or labor for their outfits write or wire the old reliable Koenig Labor Agency, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

Winston Brothers Company were awarded contract for laying steel on the new Missouri Pacific double-track work between Kirkwood and Jefferson City, Missouri.

The Metropolitan Paving Company are low bidders on State Highways in DeKalb County, Missouri.

The Koss Construction Company were awarded a couple of road contracts in Benton County, Missouri.

Mike Haase got in on two highway contracts in Macon County, Missouri.

The Illinois State Highway Department on July 8th awarded the following contracts: Paving Section 430, Route 4, Dupage and Cook Counties, R. F. Conway Company; Section 2, Route 3, Cass and Morgan Counties, Devine Construction Company; Grading Section 18A, Route 1, Fulton County, E. P. Olson; Grading Section 12D, Route 13, Jackson County, Hamilton-Hoffman Construction Company; Section 2B, Route 3, Morgan County, Herrick Construction Company; Bridge Section 10B, Route 40, Jo Daviess County, W. H. Shons Company.

Mike Costello of Costello Brothers & Mays motored into St. Louis from Kentucky. Mike says their highway work in Kentucky and railroad work in Alabama is getting along fine.

C. F. Johnson & Sons were awarded contract for highways in Laclede County, Missouri.

BUILDERS OF TRENCH EXCAVATORS FOR 30 YEARS

No Stops for Repairs

though so[illegible] of [illegible] material [illegible] it couldn't be dug with a pick

"This machine has been in sand, clay, cemented gravel, iron ore and hard pan. Some of the material was so hard it could not be dug with a pick.

"This machine has never been stopped for repairs and has no parts replaced except minor wearing parts. The machine is still in excellent condition, and at present is cutting in stiff clay 16 feet deep.

"Where surplus excavation must be removed from the street the High Quick Shift Conveyor permits loading wagons on one side while the spoil bank is on the other side. This saves loading cost."

The foregoing is part of a letter from Smith Bros., Dallas, Texas, written 1½ years after buying their C-15 Buckeye.

Why is it that so *many* Buckeye owners send us such *favorable* reports? Simply because *we build Buckeyes as tho we were going to use them ourselves — extra* strong, *plenty* of power and *easy* to operate.

That's the *big* reason, in a few words.

Ask any *owner*.

The Buckeye Traction Ditcher Company
Findlay, Ohio

Manufacturers of Trench Excavators (both Wheel and Chain-and-Bucket Types), Pipe Line Trench Excavators, Tile and Open Ditchers, Back-Fillers, Pipe Screwing Machines, Curb Diggers and Clay Diggers.

THERE'S A BUCKEYE SALES AND SERVICE OFFICE NEAR YOU

For convenience in making inquiry use postal inserted in this number.

Ruth Dredger Sales Corp.
Boyle and Slauson Aves.
Los Angeles, Cal.

Send us Bulletin No. 8 - we're interested in—

Irrigation ☐ Reclamation ☐ Drainage ☐

Name _____

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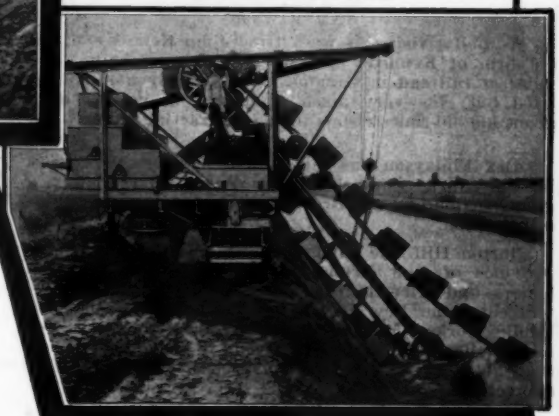
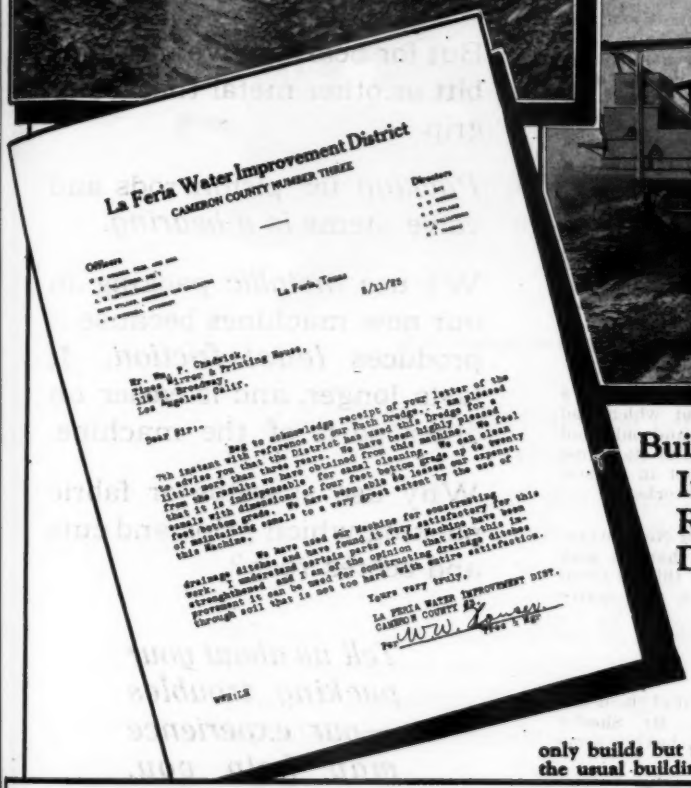




La Feria Water Improvement District
CAMERON COUNTY NUMBER THREE

Officers

Directors

La Feria, Texas 8/11/25

Mr. Ch. F. Chadwick,
Times Mirror Printing House,
118 N. Broadway,
Los Angeles, Calif.

Dear Sir:-

7th instant with reference to our Ruth Dredger. I am pleased to advise you that three years. We have been highly pleased little more than three years. We have been highly pleased with the results we have obtained from this machine. We feel that it is indispensable for canal cleaning. We can clean from the regular banks of canal to a depth of four feet bottom grade up to twenty feet maintaining grade. We have also found it very economical to operate this machine. We can clean canals to a very great extent by the use of this machine.

We have used our Machine for constructing drainage ditches and have found it very satisfactory for this work. I understand certain parts of the machine have been strengthened and I am of the opinion that with this improvement it can be used for constructing drainage ditches through soil that is not too hard with entire satisfaction.

Yours very truly,

LA FERIA WATER IMPROVEMENT DIST.
CAMERON COUNTY No. 3

By _____
Vice & Mgr.

WHITE

Builds *new and cleans* Irrigation Canals, Reclamation and Drainage Ditches

and The All Purpose Ruth Super Crawler Dredger with a full head of water in the ditch or when dry, will handle all cleaning work taking out silt, gumbo, muck, water grass, moss, small willows and all growths that cause so much trouble in irrigation and drainage ditches. Not only builds but maintains the ditch at less than half the usual building and maintenance cost.

RUTH "SUPER-CRAWLER" DREDGER

RUTH PATENTED SUPER CRAWLER DREDGER

For convenience in making inquiry use postal inserted in this number.

Fluekiger & Jacobs secured two road contracts in Franklin County, Missouri.

J. M. Birmingham was awarded contract for gravel road in Osage County, Missouri.

The Republic Construction Company was awarded contract for grading state road in Ozark County, Missouri.

H. R. Boone of St. Louis will grade 4½ miles of state road in Warren County, Missouri.

Canada

Montreal and Vicinity

BY J. M. WARD

We had a visit this week from John Kennedy, of the old firm of Kennedy and MacDonald, who built many miles of railroad in Canada. Mr. Kennedy has now retired but was very much interested in getting news about his old-time friends in the contracting game.

Alex Finlayson has taken on some more road work for the Nova Scotia Highways Board, and already a great portion of Cape Breton's good roads are due to his construction.

Burton Hill, the chief engineer of the Highways of Province of New Brunswick intends to seek political honors, and after the elections it is understood that he will enter the New Brunswick Cabinet as Minister of Public Works. Mr. Hill has many friends, and is well and popularly known, and everyone is delighted to know that his efforts in New Brunswick are to be further appreciated.

The recent provincial election in Nova Scotia was a great surprise, and the liberal government which had been in power for 43 years was defeated and only had three members elected. It is a little early to state just what policy the new government will adopt in connection with the highways and other public works.

The elections are due in the Province of New Brunswick this year, and it is quite possible that we may have federal elections next fall. However, this as usual upsets matters, and we do not look for a very active season on this account.

Toronto and Vicinity

BY C. F. ENGLAND

It was with extreme regret that we heard of the death of Mr. Richard Sheehy of Peterborough. Mr. Sheehy was well known in the construction field, having some large work to his credit in Canada.

The Godson Contracting Company, Limited, have a contract for pavements in the Town of Port Hope, Ont.

We had a visit the other day from Mr. Creelman, contractor of Winnipeg.

Roger Miller & Sons, Limited, have been awarded contract for new Spadina Avenue Bridge, Toronto. This is the first contract which has been let in connection with the new Toronto Terminus scheme.

We had a visit from W. L. Malcolm of Kingston. He reports his road work going very nicely at Hillsburg, Ontario.

Consider This!

THE *best* brake-band lining—the kind we use on our machines—contains about 85% asbestos. It's great stuff. It grips.

But for bearings we use babbitt or other metal that *won't* grip.

Packing for piston rods and valve stems *is a bearing.*

We use *metallic* packing in our new machines because it produces *least friction.* It lasts longer, and is easier on other parts of the machine.

Why use asbestos or fabric packing which grips and cuts and scores rods?

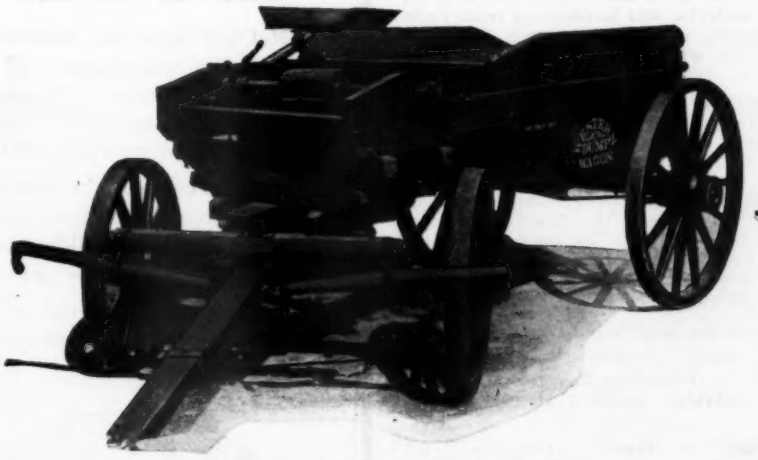
Tell us about your packing troubles—our experience may help you.

BUCYRUS COMPANY

Specialty Department

South Milwaukee, Wis., U. S. A.

Your Favorite Dump Wagon
with Wood Bolster and Drop Tongue



Wood Bolster and Drop Tongue

If you prefer a wood bolster on your dump wagon order your favorite Westerns with that construction.

We furnish Western dump wagons with drop tongue and wood bolsters if desired. The drop tongue, of course, you want for the average conditions under which Western wagons work. The ease with which wood bolsters can be repaired appeals to many contractors who will be glad to know that the easy and dependable Western wagon can be secured with drop tongue and wood bolster.

May we discuss your dump wagon needs? Write today for catalog B-62.

Western Wheeled Scraper Co.

Founded 1877

Earth and Stone Handling Equipment

AURORA, ILLINOIS

For convenience in making inquiry use postal inserted in this number.

Vancouver and Vicinity

BY J. C. MOON

The British Columbia Electric Railway Company will build a power transmission line from Bamberton to Nanaimo this year, if the electors of Duncan and Ladysmith agree to their terms for supply of power.

The British Columbia Gypsum Co., Limited, will establish a plant at Port Mann and build a mill to grind gypsum rock; raw material will be obtained from Falkland, British Columbia, on the new branch line from Kamloops to Kelowna, which will be completed at an early date.

Great interest is being taken in the proposed development of the Hat Creek Coal Mines situated near the Pacific Great Eastern Railway. Drilling to prove the extent of the deposit is still under way, but already a very large body of coal has been found. It is expected that a spur line from the Pacific Great Eastern Railway will be built which will be about 15 miles long, in order that the coal can be transported to tidewater at the lowest cost. Mr. A. C. McDougall, a well-known Vancouver contractor, is one of the leading men in the development of this property.

Winnipeg and Vicinity

BY F. X. AMOSS

Mr. James Pike of Edmonton has been appointed manager of the Lethbridge Northern Irrigation Association.

It is reported that S. S. Magoffin & Company of Edmonton has secured the contract for the trestle filling at Lyons Creek, British Columbia. There are approximately 900,000 yards of filling required to be done this year.

TRADE NOTES

Barber-Greene Company of Aurora, Illinois, have just completed an addition to their office building, designed particularly for the use of their Designing and Engineering Departments.

The Chicago, Burlington and Quincy Railroad has successfully constructed steel buildings entirely by the use of art welding, securing thereby stronger joints at a much lower cost than by the customary method of welding. The method is described fully in Westinghouse Electric Manufacturing Company's folder No. 4657. Copies of this publication may be obtained by addressing any of the Westinghouse sales offices, or the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania.

A connection has been arranged between Carels of Ghent, Belgium, and the Ingersoll-Rand Company of New York City, by which the Belgium concern will have the right to manufacture the Ingersoll-Rand solid injection type of oil engine. It is interesting to note that this Belgian firm, organized in 1875, who have manufactured Diesel engines for many years, have made this connection with the Ingersoll-Rand Company.

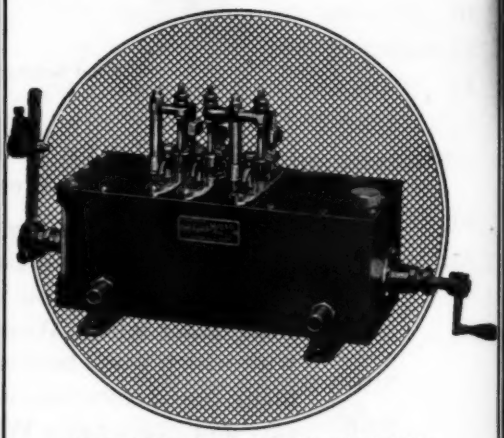
The American Manganese Steel Company announce the placing in operation of their new plant at Los Angeles, California. The new plant has the best of modern equipment, and production aimed for is 100 tons a month.

A McCord Force Feed Lubricator Will Keep Your Shovel on the Job

A McCord force feed lubricator installed on your steam shovel now will insure more continuous operation. Dependable force feed lubrication prevents shutdowns and delays, it gives more hours on the job.

McCord force feed lubricators are used as standard equipment by the largest and best-known steam shovel builders and they will be installed on any shovel at your request.

Put a McCord lubricator on now and be assured of dependable lubrication for the life of your shovel.



McCord Class B. A. Force Feed Lubricator

McCord Radiator & Mfg. Co.
Detroit, Michigan

McCord
force feed
Lubricators

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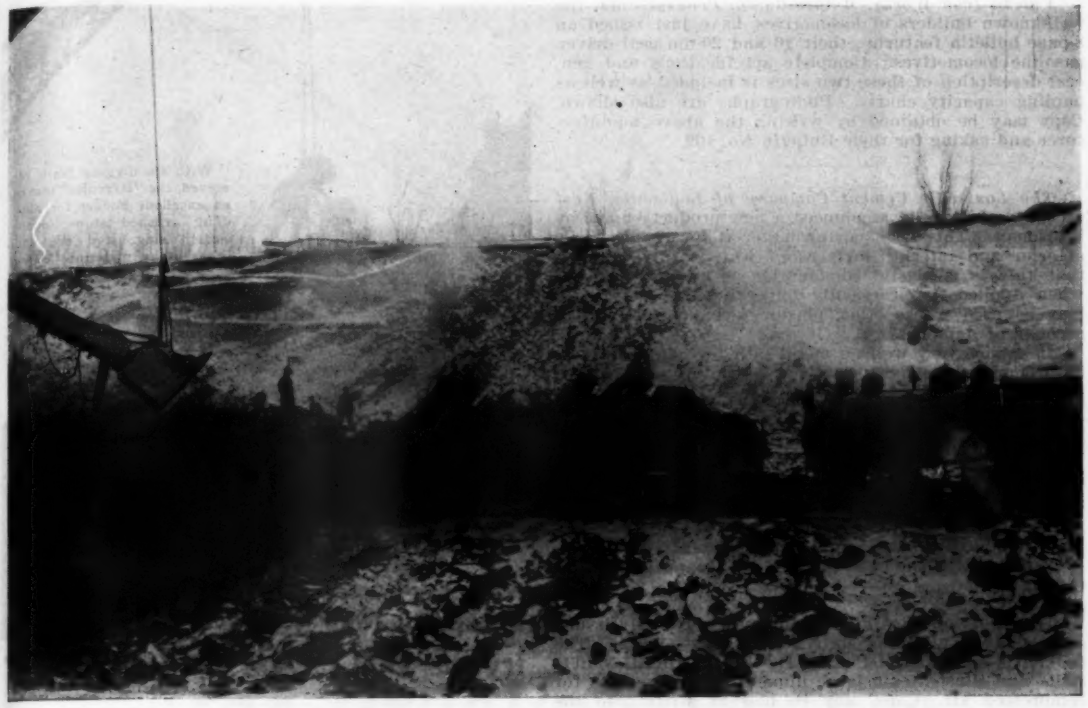


Extension Side Dump Cars in Coal Stripping Service

EXTENSION SIDE DUMP CARS were selected for this large coal stripping job for two principal reasons: First, because they will stand up day in and day out under the heaviest kind of service conditions; and second, because the down-turning door feature removes all loading restrictions from the shovel.

The material handled consists chiefly of large boulders.

EXTENSION SIDE DUMP CARS pay big dividends in work of this kind.

May we send you full particulars?

CLARK CAR COMPANY

Oliver Building
PITTSBURGH, PA.

NEW YORK OFFICE: 52 Vanderbilt Ave.
SAN FRANCISCO OFFICE: Rialto Building
CHICAGO OFFICE 122 South Michigan Ave.

For convenience in making inquiry use postal inserted in this number.

Vulcan Iron Works, Wilkes-Barre, Pennsylvania, the well-known builders of locomotives, have just issued an 8-page bulletin featuring their 16 and 20-ton gear-driven gasoline locomotives. Complete specifications and general description of these two sizes is included as well as hauling capacity charts. Photographs are also shown. Copy may be obtained by writing the above manufacturer and asking for their Bulletin No. 102.

The Louisville Cement Company of Louisville, Kentucky, have recently announced a new product known as Walsment. This is a mortar material for covering the exterior and interior surfaces of walls. It is claimed that this is a plastic combination of cements, which, when applied, is practically impervious to water and may be used where other plasters are not efficient on account of dampness.

It applies very well on metal lath for exteriors, and, on account of its hardness, it is splendidly adapted for interiors, as it will not scar.

It has the advantage of not being affected by age when kept in storage, and may be stored two years or longer without deterioration.

The Little Red Wagon Manufacturing Company announce a new 11-yard wagon — the Stroud "Mammoth Red." This wagon is handled readily by a ten-ton tractor. For full particulars write the manufacturer at Omaha, Nebraska.

The *Sullivan Machinery Company* has recently issued an attractive bulletin of sixteen pages, size 8½ x 11. The booklet is entitled "YOU CAN DO IT QUICKER WITH AIR" and illustrates a large number of applications for compressed air. Copy may be had by writing to the *Sullivan Machinery Company, 122 South Michigan Avenue, Chicago*, requesting Bulletin No. 126.

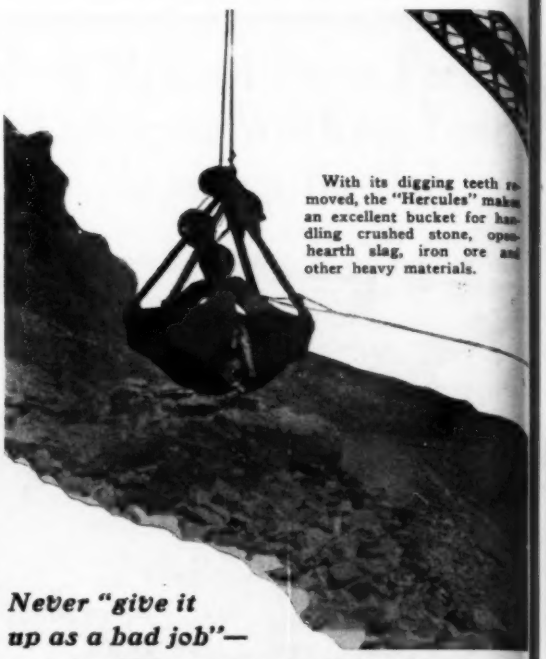
Mr. G. R. Lyman, general sales manager of the Taylor-Wharton Iron and Steel Company, resigned, effective May first. Mr. G. R. Hanks, formerly superintendent of the High Bridge plant of this company, has been appointed assistant to the president with full charge of all sales. Mr. Stanley Apgar has been appointed plant superintendent.

The Lapeer Trailer Corporation announces the appointment of Mr. L. M. Bovaird as manager of the Detroit Branch. Mr. Bovaird was formerly branch manager for the Mason "Road King."

Gibbons & Griffin Company, producers of sand and gravel, have closed their Chicago office at 118 North La Salle Street, Chicago, and are now doing business at their plant office in Carpentersville, Illinois. Matter addressed to them at P. O. Box 261 will reach them.

H. D. Church, formerly chief engineer of the truck department of The Packard Motor Car Company, and for the past eighteen months assistant chief engineer of The Chevrolet Motor Company, will go to The White Motor Company on May 15 as director of engineering.

George W. Smith, formerly in charge of the experimental and research departments of White Motor, has returned to the company as technical assistant to vice-president and general manager, Thomas H. White, and will have charge of the technical division of the staff.



With its digging teeth removed, the "Hercules" makes an excellent bucket for handling crushed stone, open-hearth slag, iron ore and other heavy materials.

Never "give it up as a bad job"—

try the WILLIAMS "Hercules"

Before you start "shooting" the material, try this powerful digger. It outdigs all other buckets in hardpan, blue clay, and other stiff materials.

Here's one more case where WILLIAMS Buckets made good on one of those "it-can't-be-done" digging jobs: "We had considerable trouble trying to get through a stratum of hardpan with several other makes of buckets, and were about to give it up as a bad job, but our two 1-yard 'Hercules' Buckets have most certainly solved our excavating problem." (Name on request.)

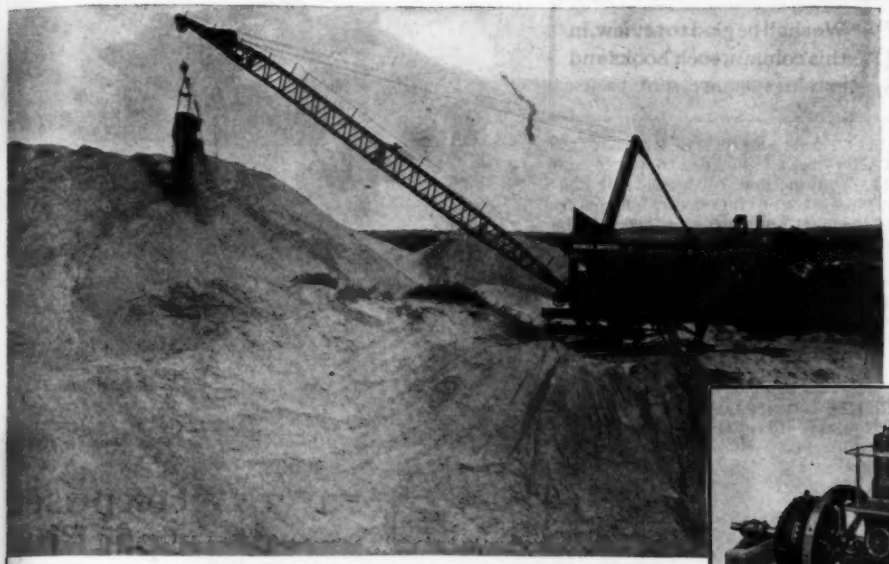
The Hercules "carries on" where other buckets give up. It *stands up*. No counterweights. Every ounce of weight is built right into this heavy bucket.

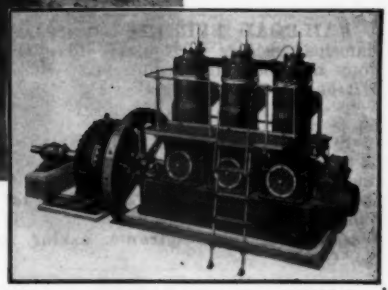
And the hard working "Hercules" carries the regular WILLIAMS guarantee: *All parts are guaranteed against breakage, as long as the bucket is used on the classes of work for which we recommend it.*

Write for complete specifications of the "Hercules."

G. H. WILLIAMS COMPANY, 603 Hayburger Lane, Erie, Pa.
Eastern Sales Office: 30 Church Street, New York City

WILLIAMS
FAST-DIGGING BUCKETS
All Parts Guaranteed Against Breakage





The Leading Diesel for Dragline Service

Through sheer merit the Type "Y" Diesel has taken the lead. In the steady grind of dragline and dredge service the Type "Y" has proved that it is more than equal to the most strenuous tasks. It is a 2-cycle valveless, airless injection, cold starting engine that operates at about one-fourth the cost of steam power.

FAIRBANKS, MORSE & CO., Chicago

Manufacturers of Oil Engines, Pumps and Electrical Machinery

FAIRBANKS-MORSE

Type "Y" Diesel Engine

THE PRODUCT OF EXPERIENCE

978

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REVIEW OF BOOKS and CATALOGS

We shall be glad to review, in this column, such books and catalogs as are sent to us.

HOW TO USE CAL TO MAKE THE BEST CONCRETE AND MORTAR — 3½ x 6 inches, 16 pages and cover. Fully describes the method of using this material for controlling the set and increasing the early strength of Portland cement mixtures. Instructions cover hand-mixed and machine-mixed concrete or mortar. Items included are: protecting finished work, frost proofing, water proofing, streets, sidewalks and highways, bonding and patching granolithic, surface wash, easy chuting, etc. Copy of this booklet may be obtained from the *Security Cement & Lime Company, Hagerstown, Maryland.*

RAILROAD BUCKETS — 8½ x 11 inches, describes clamshell buckets particularly adapted for railroad use. Copy may be had by addressing *Blaw-Knox Company, Pittsburgh, Pennsylvania.*

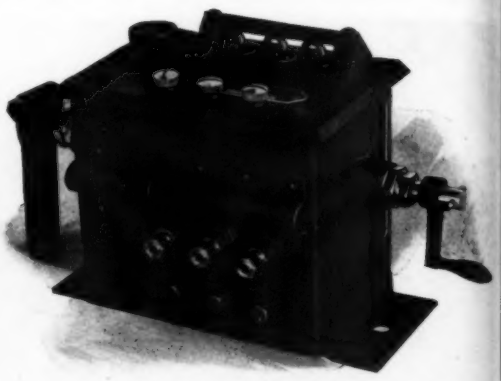
SCHRAMM AIR COMPRESSORS — 7½ x 10½ in., 32 pages and cover. This catalog describes in detail the line of air compressors manufactured by Schramm, Inc. It also illustrates a number of uses of their pneumatic tools. If you desire a copy write to *Schramm, Inc., West Chester, Pennsylvania,* asking for their catalog No. C25A.

POWER TRANSMISSION MACHINERY DATA — Just off the press, 448 pages, covers cut gears, cast gears, spur gears, speed reducers, enclosed worm-gear drives, cast-iron pulleys, friction clutches, sprocket wheels, hangers, pillow blocks, couplings, rope sheaves, etc. For your copy write *W. A. Jones Foundry and Machine Co., 4401-51 West Roosevelt Road, Chicago, U. S. A.* and ask for General Catalog No. 30.

DESIGN AND CONTROL OF CONCRETE MIXERS — 8½ x 11 inches, 20 pages, with cover, illustrated with cuts, charts and tabulation. Describes the simple equipment required, and the tests that are made on the job to secure concrete of predetermined strength. Typical examples show how easily the principles are applied. A valuable aid to those who are striving to eliminate haphazard field methods. For copy write *Portland Cement Association, 111 West Washington Street, Chicago, Ill.*

STROUD "LITTLE RED"

The Little Red Wagon Mfg. Co.
Omaha, Nebraska



Madison-Kipp Lubricators come in Blind and Sight Feed Types. Blind Feed up to four feeds. Sight Feed—any number of feeds.

NO valves — exposed parts—or packing

Force-feed lubrication can be done without ball and check valves — without exposed parts that gather dirt and trouble — without plunger or piston packing that will have to be renewed from time to time.

Madison-Kipp Lubricators have no valves. They work on the Kipp valveless principle.

They are self-contained. All working parts are enclosed and operate in oil.

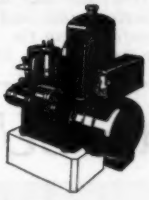
Their plungers require no packing whatever.

We have prepared a bulletin which describes the inside mechanism of Madison-Kipp Lubricators which we will send to anyone requesting it.

May we mail one to you? Ask for Bulletin No. 50.

Madison-Kipp Corporation
Madison, Wisconsin, U.S.A.

Speeding the Job with Electric Lights—



A Kohler Electric Plant on the platform of your excavator will speed the job to completion by supplying electric light for night operations. The plant has ample current also to light men's shacks, garages, stables and other buildings.

Its power will operate pumps, air compressor, emery wheels and other tools.

The plant is compact because it is without storage batteries. It is dependable and economical. Current is the standard 110-volt kind.

Our 48-page booklet "The Principle and the Proof" tells more about this unusual plant and of its use by contractors and others in every field. Write for it.

KOHLER OF KOHLER

KOHLER CO., *Founded 1873*, KOHLER, Wis.
Shipping Point, Sheboygan, Wis.

A 33rd edition of HENDRICKS COMMERCIAL REGISTER is now off the press and ready for distribution. It is a huge volume, and yet it is compiled typographically in such a manner as to contain a great amount of information. It is a very complete directory of the products of American manufacturers at present in existence. It should be of great use to buyers of equipment. It is published by *Hendricks Commercial Register, 17 5th Avenue, New York, and 18 East Huron Street, Chicago.* The price is $12.00.

THE MILBURN LIGHT—3¼ x 6 inches, 24 pages and cover, describing acetylene lights for use in steam shovel work made by the *Alexander Milburn Company, West Baltimore Street, Baltimore, Maryland.*

AUTOMATIC HEAT-TREATING MACHINES FOR ROCK DRILL BITS—6 x 9 inches, 16 pages. Illustrates and describes a method of heat treatment, which increases the life and efficiency of the tools used in rock drilling. The result of many years of searching study, under practical working conditions, this method is based on scientific research and eliminates the personal element by substituting mechanical control. For copy write *Gilman Manufacturing Company, East Boston, Massachusetts,* and ask for Bulletin No. 103.

HAND HELD ROCK DRILLS—For the Mine, the Quarry, and the Contractor, 6 x 9 inches, 27 pages, with cover. Illustrates and describes all of those new and practical ideas in rock drill design and construction that many years of experience has demonstrated to be necessary for the best performance and service. For your copy write *Gilman Manufacturing Co., East Boston, Massachusetts,* and ask for Bulletin No. 100.

BETTERING THE BEST—5 x 7, 24 pages including cover. This bulletin describes and illustrates recent improvements in the Best Tractors. Copy may be had by addressing the *C. L. Best Tractor Company, 30 Church Street, New York.*

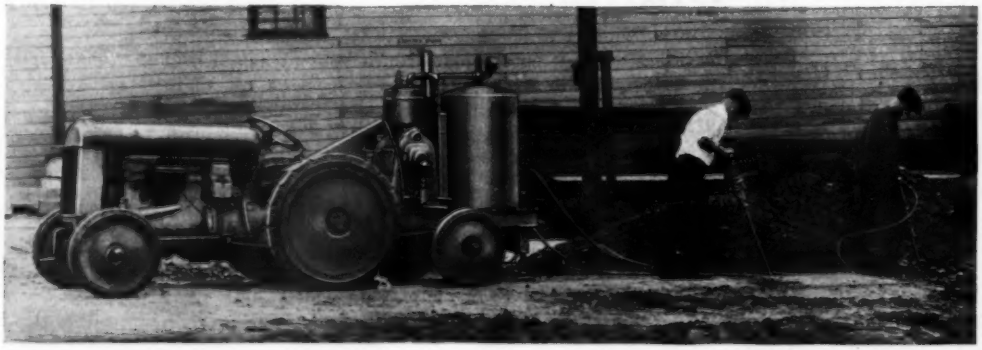
THE COMMERCE YEAR BOOK—722 pages, substantially bound, presents an authoritative summary of leading developments of American business, including both domestic and foreign trade, and of general economic conditions abroad. Address *Superintendent of Documents, Government Printing Office, Washington, D. C.* Price 85 cents.

DITCHING WITH DYNAMITE—6 x 9 inches, 36 pages and cover. This book with twenty-one illustrations gives detailed information on the blasting of ditches in all parts of the country. For copy write the *E. I. du Pont de Nemours Company, Inc., Wilmington, Del.*

MODERN METHODS IN DIESEL ENGINE BUILDING, 8½ x 11, 32 pages and cover. A description of the methods of manufacture used by *Fairbanks, Morse & Company,* illustrated in colors. Copy may be had by addressing the company at Chicago, Illinois, and asking for Bulletin 1040.

SUPERHEAT ENGINEERING DATA—A handbook on the Generation and Use of Superheated Steam. Sixth Edition Revised. (Superseding Data Book for Engineers.) The Superheater Company, New York and Chicago, 1925. Bound in Keratol, 4½ x 7 inches, 208 pages, 85 illustrations and diagrams, 69 tables. Price $1.00.

By Using the *CURTIS*-FORDSON Compressor Unit



YOU GAIN—

Complete control over moving compressor when and where you need it—So you pay mighty little for idle time.
Maintenance service—anywhere—for the Fordson which drives compressor—So you lose no time from engine troubles.
Slow compressor speed—automatic lubrication—circulating water—So you can run continuously without fear of overheating.
Extra Service—for compressor detaches immediately when not required—So Fordson is always available for general tractor purposes.

There are no offsets to these advantages. Write for Bulletin C-4-A.

CURTIS PNEUMATIC MACHINERY CO. [Established 1845] **1684 Kienlen Avenue, ST. LOUIS, MO. Branch—30 Church St., NEW YORK**

For convenience in making inquiry use postal inserted in this number.

IT IS RASH TO SAY "BEST"

Almost invariably, in this day, a number of companies make goods of high excellence in every line. It is rash for any manufacturer to proclaim that his products are best.

It is equally rash for a manufacturer to presume to know as much about his customers' business as they do. Possibly—and you are the sole judge—we cannot be of any help to you at all.

However, in years of practical experience we have developed a series of explosives and blasting supplies which are effectively and economically meeting the most exacting requirements of the coal and metal mining, quarrying, and construction industries.

Naturally, in accomplishing this we have acquired a broad knowledge of blasting. If you think it might be of use to you, draw upon it. We hope, if you accept our offer, that you as well as ourselves, will profit by our association.

The following publications will be sent free, upon request: Scientific Quarry Blasting, Hercoblasting, Modern Road Building, Safety in the Use of Explosives, Eliminating Waste in Blasting, Shot Firing by Electricity, Hercules Galvanometers & Rheostats, Dynamite: the New Aladdin's Lamp, Conquering the Earth. Address, Hercules Powder Co., 987 King St., Wilmington, Del.

LLENTOWN, PA.
RMINGHAM, ALA.
UFFALO, N. Y.
ATTANOOGA, TENN.
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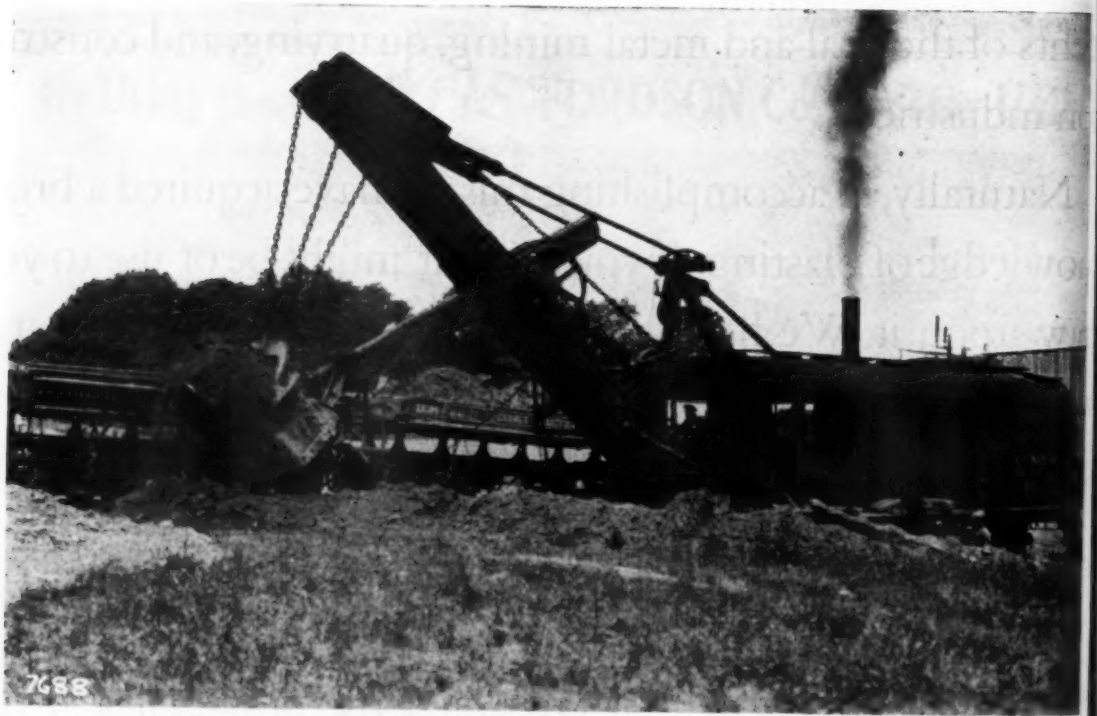
PITTSBURG, KAN.
PITTSBURGH, PA.
POTTSVILLE, PA.
ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN FRANCISCO, CALIF.
WILKES-BARRE, PA.
WILMINGTON, DEL.

HERCULES POWDER CO.

General View of the Partially Completed 200,000-cubic-yard Cut at Dominion Construction Company's Camp No. 1.



One of Dominion Construction Company's Bucyrus 70-C Railroad-Type Shovels in Shallow Digging at Camp No. 2 Loading a Train of Western Cars